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(54) INTERIOR MATERIAL FOR CAR AND PRODUCTION THEREOF

(57)Abstract:

PURPOSE: To economically and advantageously provide an interior material for a car having both of high sound absorbing and blocking properties and rigidity and equipped with good touch and excellent aesthetic appearance by a simplified process.

CONSTITUTION: An interior material for a car is constituted of a sound absorbing and blocking nonwoven fabric composed of staple fibers made of a thermoplastic synthetic resin as a whole and has a nonwoven fabric design layer wherein constitutional fibers are colored containing at least one surface of the nonwoven fabric. The design layer 2 may be integrally laminated on a shape retaining reinforcing nonwoven fabric base material layer 1.



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CLAIMS

[Claim(s)]

[Claim 1] Interior material for automobiles characterized by being constituted including the sound-absorbing-and-insulating nonwoven fabric which can contain the nonwoven fabric base material layer for firmness enhancement by which the laminating was carried out to this design layer in one, and consists of a staple fiber of a thermoplastic synthetic fiber as a whole while configuration fiber including one [at least] front face was colored and forming the nonwoven fabric design layer.

[Claim 2] Interior material for automobiles of claim 1 whose weight ratios of said design layer and base material layer are 3:97-100:0.

[Claim 3] Interior material for automobiles of claims 1 or 2 whose average sizes of the staple fiber which constitutes said base material layer the average size of the staple fiber which constitutes said design layer is 0.2-15 deniers, and are 1.5-40 deniers.

[Claim 4] It sets, after the sound-absorbing-and-insulating nonwoven fabric as the whole fabricating, and they are the average thickness of 1-50mm, and 0.01 - 1.0 g/cm³. Interior material for automobiles of claims 1, 2, or 3 which have average apparent density gravity.

[Claim 5] Interior material for automobiles of any 1 term of claims 1-4 which the staple fiber which constitutes said design layer is colored by carrying out arrival at Hara in front of dyeing or spinning.

[Claim 6] Interior material for automobiles of any 1 term of claims 1-5 said whose thermoplastic synthetic fibers are polyester fiber.

[Claim 7] The staple fiber of said thermoplastic synthetic fiber It consists of at least two sorts of staple fibers which mainly contain 5 - 80 % of the weight (fiber A) of high softening temperature polyester system staples, and 20 - 95 % of the weight (fiber B) of low softening temperature polyester system staples which have softening temperature lower at least 20 degrees C than the above-mentioned fiber A. It comes to carry out welding of a part of intersection [at least] with the configuration fiber in contact with this fiber B and it. Said sound-absorbing-and-insulating nonwoven fabric is 0.01 - 1.0 g/cm³. Interior material for automobiles of any 1 term of claims 1-6 whose retention of bending elastic inclination [in / it has average apparent density and / 90 degrees C] is at least 30%.

[Claim 8] Said fiber A is the interior material for automobiles of claim 7 to which it comes at least to form said fiber B from the denaturation polyester which has the softening temperature when the periphery section is lower than Fiber A 20-120 degrees C by being formed from high softening temperature polyethylene terephthalate.

[Claim 9] Interior material for automobiles of claim 8 which is the sheath-core mold conjugate fiber which uses as a heart component said high softening temperature polyethylene terephthalate with which arrival at Hara of said fiber B was carried out, and uses as a sheath component the denaturation polyester which has softening temperature lower 20-120 degrees C than it, and by which arrival at Hara was carried out.

[Claim 10] Interior material for automobiles of claim 8 which is single component fiber in which said fiber B was formed from the denaturation polyester which has softening temperature lower 20-120 degrees C than Fiber A.

[Claim 11] Said denaturation polyester is the interior material for automobiles of the melting point of 200 degrees C or less, and claims 8, 9, or 10 which are crystalline low-melt point polyester which has the heat of fusion of 6 cal/g at least.

[Claim 12] Interior material for automobiles of claim 11 in which said denaturation polyester has the melting point of 150-200 degrees C.

[Claim 13] The staple fiber web for design layers which consists of a colored thermoplastic synthetic fiber, and it are the manufacture approach of the interior material for automobiles characterized by carrying out the laminating of the staple fiber web for base material layers which consists of the above produced by another object, coloring of the same kind, or a non-coloring thermoplasticity synthetic fiber, and carrying out the junction unification of both by needle punching and/or heating adhesion.

[Claim 14] The manufacture approach of the interior material for automobiles of claim 13 which supplies the staple fiber web for design layers colored from at least one set of the cross layer which contains the object for outermost layer web supply, using two or more cross layers continuously.

[Claim 15] The manufacture approach of the interior material for automobiles of claims 13 or 14 that the weight ratios of said staple fiber web for design layers and the staple fiber web for base material layers are 3:97-100:0.

[Claim 16] The manufacture approach of the interior material for automobiles of any 1 term of claims 13-15 that the average size of said staple fiber for design layers is 0.2-15 deniers, and the average size of said staple fiber for base material layers is 1.5-40 deniers.

[Claim 17] After said unification, it fabricates further and they are the average thickness of 1-50mm, and 0.01 - 1.0 g/cm³ as a whole. The manufacture approach of the interior material for automobiles of the interior material for automobiles of any 1 term of claims 13-16 characterized by making with the sound-absorbing-and-insulating nonwoven fabric which has average apparent density gravity.

[Claim 18] The manufacture approach of the interior material for automobiles of the interior material for automobiles of any 1 term of claims 13-17 that the staple fiber of said thermoplastic synthetic fiber consists of at least two sorts of staple fibers containing thermal melting arrival nature fiber.

[Claim 19] The manufacture approach of the interior material for automobiles of any 1 term of claims 13-18 that said thermoplastic synthetic fiber is polyethylene terephthalate system fiber.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention has the interior material for automobiles, and the function which was excellent especially in appearance quality, such as sound absorbing and insulating characteristics, tactile feeling, and aesthetics, etc., and relates to the interior material for automobiles applied suitable for the part which needs rigidity high for configuration maintenance, for example, a door trim, headlining, a trunk trim, a dash insulator, etc.

[0002]

[Description of the Prior Art] In recent years, tactile feeling of the silence of the vehicle interior of a room and interior material, improvement in aesthetics, etc. are demanded with upgrading of an automobile, and high-performance-izing. However, ** et al. and the conventional interior material for automobiles had many which additional functions, such as attaching-to thing cheap generally-importance remainder, absorption of sound and noise insulation, tactile feeling, and aesthetics, were ***** (ed) in many cases, and had these outstanding additional functions. That is, the thing of a configuration of having stuck charges of a sound absorption and insulation material, such as epidermis, for example, a nonwoven fabric, an elastomer, and textile fabrics, to base material parts, such as a rigid high panel for holding a configuration conventionally, has only occupied the mainstream of the interior material for automobiles. Thermoplastics is sunk into inorganic fibers, such as a woody board, and felt which used heat-curing mold binders, such as phenol resin, for the regenerated fiber or a glass fiber, as an example of a type of these base material part, and hot pressing, the so-called FRTP which carried out cold pressing or sandwich structure, and the panel produced using the made charge of foam are mentioned. However, although what naturally consists of these base materials demonstrated the configuration maintenance effectiveness, it did not escape the fall of sound-absorbing-and-insulating ability, but further, it became complicated constituting it and it not only hardly has the above-mentioned additional functions, such as surface aesthetic property and tactile feeling, but it had the trouble that a process also increased. Thus, in the conventional interior material for automobiles, whenever configuration maintenance is difficult and increased rigidity with rigid lack for configuration maintenance, while the fiber aggregate which has good sound-absorbing-and-insulating ability encountered the antinomy that sound-absorbing-and-insulating ability fell remarkably, it had the following faults further.

[0003] It is that there is no recycle nature in the 1st. This originates in an ingredient being different from a base material also in an epidermis part in addition to a base material being the multilayer structure from which the ingredient for every layer is different.

[0004] The phenol resin used in order to raise [2nd] rigidity in the felt, a woody board, etc. conventionally is releasing an unpleasant smell. An unpleasant smell in the case of using as interior material for automobiles was made into the practically big problem, and, naturally alternate material was called for.

[0005] To the 3rd, the conventional ingredient had high possibility of generating the rigid panel of a car body, and the allophone in which it interferes each other, in the condition of having been attached to the car. Since the device which puts a flexible nonwoven fabric and urethane foam between the base material of interior material, a panel side, or an interference side with other components in order to solve this was needed, an excessive man day and components were required and economical disadvantage was not escaped.

[0006] Since a tabular thing was used as a base material, it is difficult to secure permeability and it was not able to give [4th] sufficient absorption-of-sound engine performance.

[0007] this invention person etc. proposed the interior material for automobiles constituted including the fiber aggregate with which average apparent density and bending elastic inclination were specified as Japanese Patent Application No. No. 245269 [six to] including the synthetic-fiber staple of a different kind with which fineness

and softening temperature were specified, in order to cancel these faults. In order to have considered as the interior material product which finally gave the fine sight although many additional functions were obtained when this fiber aggregate was used as a base material, the epidermis produced separately from this base material had to be again stuck for example, using the thermal melting arrival film etc., and it became clear that there was a trouble of needing the process for it.

[0008]

[Problem(s) to be Solved by the Invention] This invention was made paying attention to such a conventional trouble, has simultaneously higher sound absorbing and insulating properties and rigidity, is equipped with many additional quality functions, such as good tactile feeling and an outstanding fine sight, and aims at offering the interior material for automobiles which becomes a still simpler configuration economically advantageous at the process simplified more.

[0009]

[Means for Solving the Problem] this invention persons analyze the function of fiber aggregate, especially nonwoven fabric **, and the engine performance by combination, find out the technique of raising the rigidity and additional function, and came to complete this invention. That is, in order to solve said trouble, the fiber kind blended [which are blended and is fiber-blended] was made into what has possible acquiring rigidity as compared with the conventional thing, and it considered as the configuration further compatible also with an additional function. Furthermore, by specifying the low softening temperature fiber kind blended with the compounding ratio and the fiber aggregate of high softening temperature fiber and low softening temperature fiber again While it has the design layer which high rigidity and one [at least] front face were colored by dyeing or the arrival at Hara and the design layer has a function as epidermis of interior material It succeeded in offering the interior material for automobiles which has a high additional function by uniting the base material layer for firmness enhancement with it if needed.

[0010] That is, the interior material for automobiles concerning this invention can contain the nonwoven fabric base material layer 1 for firmness enhancement by which the laminating was carried out to this design layer 2 in one, and is characterized by being constituted including the sound-absorbing-and-insulating nonwoven fabric which consists of a staple fiber of a thermoplastic synthetic fiber as a whole while configuration fiber including one [at least] front face is colored and it forms the nonwoven fabric design layer 2, as shown in drawing 1 R> 1.

[0011] The weight ratios of said design layer 2 and base material layer 1 are 3:97-100:0 preferably. Since a surface coloring design layer becomes the thing of a low consistency very thinly when the weight ratio of a design layer is less than 3 % of the weight, when not coloring a base material layer, it will be transparent and visible to a front face, and will worsen aesthetics very much. Moreover, the coloring section of a design layer does not produce a problem at all in aesthetics and a rigid field about attaining to the whole base material layer and becoming 100% of the weight of percentage.

[0012] As for the average size of the staple fiber which constitutes the design layer 2, it is desirable that it is in the range of 0.2-15 deniers. A nonwoven fabric with the difficulty of reduction of the productivity according to the fall of a spinning rate at less than 0.2 deniers or web-izing at the time of nonwoven-fabric-izing to quality sufficient [an average size] is hard to be obtained. Moreover, smooth nature cannot be easily obtained by surface fuzz, in 15-denier **, it is points, such as granularity of surface texture, and it cannot expect good surface quality easily.

[0013] Moreover, as for the average size of the staple fiber which constitutes the base material layer 1, it is desirable that it is in the range of 1.5-40 deniers. Since the rigidity of fiber itself is small when an average size is less than 1.5 deniers, it becomes difficult to acquire rigidity sufficient as a base material. The fiber total number per unit volume in a nonwoven fabric decreases, a pasting up point with the below-mentioned binder fiber decreases, and it becomes impossible moreover, to desire to acquire sufficient rigidity in 40-denier **. Moreover, since the ratio of surface area/cross section becomes small when the diameter of fiber becomes large, it becomes difficult to absorb the energy of a sound efficiently.

[0014] The nonwoven fabric of this invention which has the sound absorbing and insulating properties which were excellent as a whole by such configuration is good to fabricate in average thickness of 1-50mm. When the fall of the flexural rigidity by the lack of thickness cannot be denied when average thickness is less than 1mm, and rigidity is able to be secured, desired quantity of airflow is not obtained, but it becomes difficult to give expected sound-absorbing-and-insulating ability to interior material. Furthermore, there is also a possibility of spoiling surface aesthetic property and a fine sight, according to the working pressure force at the time of shaping etc. When 50mm is exceeded, it is difficult to acquire the rigidity of the base material itself, and firmness ability is inferior.

[0015] the average apparent density of the nonwoven fabric in this invention -- 0.01 - 1.0 g/cm³ it is -- things -- desirable -- 0.01g/cm³ Since there are few fiber numbers per unit volume, while it is difficult for the following to acquire rigidity sufficient as a nonwoven fabric, desired ventilation resistance is not obtained but it is difficult to get in sufficient sound-absorbing-and-insulating ability. Average apparent density is 3 1.0g/cm. In the high condition, a nonwoven fabric is too hard, there are not the conventional panel, a board, and a place where it changes substantially, and it becomes difficult to expect an additional function.

[0016] As fiber used, independence and the fiber obtained by carrying out mixing or compound spinning are mentioned in thermoplastic polymers, such as a polyamide, a copolymerization polyamide, polyester, copolymerized polyester, a polyacrylonitrile, a copolymerization polyacrylonitrile, polyolefine, a polyvinyl chloride, a polyvinylidene chloride, and poly KURARU. from that a crystalline melting point (T_m) is high in a fiber kind, and a comparatively cheap thing -- thinking -- polyester fiber, especially acquisition -- since the melting point, tensile strength, and a modulus achieve the support function as frame fiber effectively comparatively highly, easy polyethylene terephthalate system fiber is desirable. Furthermore, since the side-by-side mold or sheath-core mold conjugate fiber which compounded gay polyester and copolymerized polyester eccentrically along with the fiber axis discovers crimp by heat treatment, and raises whenever [confounding / of a nonwoven fabric] and its moldability increases, it is desirable.

[0017] The staple fiber of the thermoplastic synthetic fiber which constitutes the nonwoven fabric of the interior material for automobiles of this invention consists of at least two sorts of staple fibers containing thermal melting arrival nature fiber preferably. Namely, the rigid fiber staple of high softening temperature [nonwoven fabric / this], i.e., the low softening temperature synthetic-fiber staple which has softening temperature lower at least 20 degrees C than 5 - 80 % of the weight (fiber A) of matrix fibers, and the above-mentioned fiber A, That is, 95 - 20 % of the weight (fiber B) of binder fiber is made into main configuration fiber, and welding of a part of intersection [at least] with the configuration fiber in contact with this fiber B and it is carried out, and it is desirable that the retention of the bending elastic inclination in 90 degrees C is at least 30%.

[0018] When Fiber A, i.e., a matrix fiber, is less than 5 % of the weight, the ratio of the low softening temperature fiber occupied to the whole becomes large too much, and it becomes difficult to acquire sufficient rigidity at the time of an elevated temperature. Moreover, in 80-% of the weight **, the ratio of binder fiber is small, and since the pasting up point between fiber decreases, it is difficult [it] to obtain coherent [sufficient rigidity and coherent / sufficient], and a moldability.

[0019] When Fiber B, i.e., binder fiber, is less than 20 % of the weight, sufficient pasting up point is not acquired like the above, but the reduction of rigidity, a moldability, a coherent defect, etc. may be caused. Moreover, since all consist of low softening temperature fiber mostly in 95-% of the weight **, it becomes difficult to secure rigidity sufficient at the time of an elevated temperature.

[0020] The staple fiber (fiber B) of the low-melt point point polyester single component fiber which has softening temperature low 20-120 degrees C to the polyester system conjugate fiber which has the sheath-core structure where the melting point of a sheath component is low 20-120 degrees C, to the melting point of a heart component as a binding material of a nonwoven fabric, or said high softening temperature fiber is desirable. This reason is for holding the configuration of this nonwoven fabric more firmly in order to make mixing of binding material and a matrix fiber homogeneity. When binding material tends to become hard locally when powdered resin is used as a binding material, and solution mold resin is used, and the fineness of main configuration fiber is low, there is a possibility of causing increase of the diameter of fiber, by adhering to a fiber front face at homogeneity. Moreover, when a melting point difference is less than 20 degrees C, the melting point of matrix fiber A, and since it is too near, it sets to the forming cycle which pastes up by dissolving binding material, and there is a possibility that not only binding material but the whole nonwoven fabric may become soft or dissolve. When a melting point difference is 120-degree-C **, since melting initiation temperature is low, it becomes difficult to secure rigidity sufficient at the time of an elevated temperature. Therefore, as for the melting point of low softening temperature fiber, it is desirable that it is 150-200 degrees C.

[0021] although the core (core part) of low softening temperature fiber is a polyethylene terephthalate homopolymer in order to secure rigidity sufficient at the time of the above-mentioned elevated temperature -- receiving -- a periphery (sheath) -- the melting point -- 200 degrees C or less -- and it is desirable that the heat of fusion is the crystalline low-melt point point denaturation polyester conjugate fiber which is 8 cal/g at least preferably in 6 cal/g, or single component fiber which consists of crystalline low-melt point point denaturation polyester at least. Although usual low-melt point point polyester is amorphism nature and it does not have the heat of fusion, the suitable crystalline low-melt point point denaturation polyester for this invention has the heat of fusion of 8 or more cal/g, and has the heat of fusion of 6 or more cal/g also in a

sheath-core mold conjugate fiber. Moreover, the low-melt point component crystallized after shaping is thermally stable compared with an amorphous low-melt point component, and the bending elastic inclination retention in 90 degrees C has 30% or more of thermal resistance. It is most desirable to use the polymer by which arrival at Hara was carried out as a constituent of these conjugate fibers or single component fiber.

[0022] Surface smooth nature, fuzz prevention, and its aesthetics improve, and it becomes possible [giving the configuration which has design nature such as irregularity, on a front face still more nearly intentionally] while firmness increases and the configuration of the nonwoven fabric of the interior material for automobiles of this invention is stable by consisting of at least two sorts of staple fibers containing a matrix fiber (fiber A) and binder fiber (fiber B) as mentioned above, and making that shaping is possible.

[0023] About the cross-section configuration of configuration fiber, especially a limit does not have anomalies, such as circular [regular] or a flat form, a Y-globe type, and a hollow form, etc. Moreover, the potential crimp nature fiber conjugate-ized [mold / the side-by-side mold or / sheath-core] also as a matrix fiber can be used suitably.

[0024] As a design layer, the staple fiber web as for which the interior material for automobiles of this invention consists of a thermoplastic synthetic fiber preferably colored [dyeing / the arrival at Hara or] by the arrival at Hara, and it can carry out the laminating of the staple fiber web for base material layers which consists of the above produced by another object, coloring of the same kind, or a non-coloring thermoplasticity synthetic fiber, and can produce both by unifying by needle punching and/or heating adhesion. Moreover, hot forming of the obtained nonwoven fabric is further carried out after the above-mentioned unification, and they are the average thickness of 1-50mm, and 0.01 - 1.0 g/cm³ as a whole. It is good to make with the sound-absorbing-and-insulating nonwoven fabric which has average apparent density gravity.

[0025] In this case, when the fiber kind of the configuration fiber of a design layer and a base material layer, combination, and color are the same, since both layers turn into a layer of one which is not distinguished, as long as it can call it the interior material which consists of 100% of design layers and has a function as a design layer, and additional functions as the whole, such as sound absorbing and insulating properties, by such single structure, they are useful as interior material for automobiles of this invention.

[0026] Moreover, the suitable example of the above-mentioned manufacturing method is the approach of supplying the staple fiber web for design layers colored from at least one set of the cross layer which contains the object for outermost layer web supply, using two or more cross layers continuously, unifying the whole by needle punching after that, and carrying out a heat setting if needed. This approach enables mass production by the continuous process.

[0027] As mentioned above, interior material for automobiles which was excellent in additional functions, such as sound absorption and insulation, tactile feeling, and aesthetics, and was combined and equipped also with original functions, such as configuration maintenance, by this invention approach. the simplified process -- with, it can provide advantageous industrially easily economically.

[0028]

[Example] The effectiveness and the example of this invention are shown below. The measuring method of each characteristic value in an example, the example of a comparison, and the conventional example was based on the following approach.

(Absorption-of-sound nature measurement) It is JIS per sample of the interior material for automobiles. The acoustic absorptivity was measured based on A1405 "the normal incidence sound absorption coefficient measuring method of the building material by the pipe method", and absorption-of-sound nature was judged. Sample size phi100mm, 125-1600Hz of measuring range.

(Abrasion test) It is JIS per sample of the interior material for automobiles. Abrasiveness ability was measured based on K7204 "the abrasion test approach of the plastics by the wear ring", and abrasiveness ability was judged. Load 250gf, count of trial 100 rotation.

[0029] It is surface density 30 g/m² by carrying out needle punch of the fiber aggregate which consists of 50 % of the weight of 2 denier x51mm polyethylene terephthalate (it is called Following PET) fiber and 50 % of the weight (heart component-ET, the sheath component: copolymerized polyester with a melting point of 170 degrees C) of 3 denier x51mm conjugate fibers by which arrival at Hara was carried out to 1Gy of examples. The nonwoven fabric design layer was obtained. furthermore, 50 % of the weight of 13 denier x51mm PET fiber and a 2 denier x51mm conjugate fiber (heart component-ET --) Sheath component : The fiber aggregate which consists of 50 % of the weight of copolymerized polyester with a melting point of 170 degrees C is nonwoven-fabric-ized by the roller card machine. When laminating with a cross wrapper and considering as a base material layer, after carrying out the coincidence injection of the above-mentioned arrival nonwoven fabric design layer

at Hara produced with another object and compressing into convention thickness, the temporary Plastic solid with a surface density 1.0 kg/m² and a thickness of 30mm was acquired by heat-treating at 180 degrees C.

The temporary Plastic solid acquired by the above was heated at the temperature of 210 more degrees C, pressing was carried out with the cold press, and the Plastic solid with a thickness of 20mm was acquired.

[0030] It is surface density 100 g/m² by carrying out needle punch of the fiber aggregate which consists of 50 % of the weight of 15 denier x51mm PET fiber and 50 % of the weight (heart component-ET, the sheath component: copolymerized polyester with a melting point of 170 degrees C) of 15 denier x51mm conjugate fibers by which arrival at Hara was carried out to 2Gy of examples. The nonwoven fabric design layer was obtained. furthermore, 50 % of the weight of 15 denier x51mm PET fiber and a 2 denier x51mm conjugate fiber (heart component-ET --) Sheath component : The fiber aggregate which consists of 50 % of the weight of copolymerized polyester with a melting point of 170 degrees C is nonwoven-fabric-ized by the roller card machine. When laminating with a cross wrapper and considering as a base material layer, after carrying out the coincidence injection of the above-mentioned arrival nonwoven fabric design layer at Hara produced with another object and compressing into convention thickness, the temporary Plastic solid with a surface density 1.0 kg/m² and a thickness of 25mm was acquired by heat-treating at 180 degrees C. The temporary Plastic solid acquired by the above was heated at the temperature of 210 more degrees C, pressing was carried out with the cold press, and the Plastic solid with a thickness of 20mm was acquired.

[0031] It is surface density 50 g/m² by carrying out needle punch of the fiber aggregate which consists of 70 % of the weight of 0.2 denier x51mm PET fiber and 30 % of the weight (heart component-ET, the sheath component: copolymerized polyester with a melting point of 130 degrees C) of 1.5 denier x51mm conjugate fibers by which arrival at Hara was carried out to 3Gy of examples. The nonwoven fabric design layer was obtained. furthermore, 50 % of the weight of 13 denier x51mm PET fiber and a 3 denier x51mm conjugate fiber (heart component-ET --) Sheath component : The fiber aggregate which consists of 50 % of the weight of copolymerized polyester with a melting point of 170 degrees C is nonwoven-fabric-ized by the roller card machine. When laminating with a cross wrapper and considering as a base material layer, after carrying out the coincidence injection of the above-mentioned arrival nonwoven fabric design layer at Hara produced with another object and compressing into convention thickness, the temporary Plastic solid with a surface density 1.0 kg/m² and a thickness of 30mm was acquired by heat-treating at 180 degrees C. The temporary Plastic solid acquired by the above was heated at the temperature of 210 more degrees C, pressing was carried out with the cold press, and the Plastic solid with a thickness of 20mm was acquired.

[0032] 50 % of the weight of 15 denier x51mm PET fiber by which arrival at Hara was carried out to 4Gy of examples, and a 15 denier x51mm conjugate fiber (heart component-ET --) Sheath component : after nonwoven-fabric-izing the fiber aggregate which consists of 50 % of the weight of copolymerized polyester with a melting point of 170 degrees C by the roller card machine, laminating with a cross wrapper and compressing into convention thickness, by heat-treating at 180 degrees C The temporary Plastic solid with a surface density 1.0 kg/m² and a thickness of 30mm was acquired. The temporary Plastic solid acquired by the above was heated at the temperature of 210 more degrees C, pressing was carried out with the cold press, and the Plastic solid with a thickness of 20mm was acquired.

[0033] It is surface density 250 g/m² by carrying out needle punch of the fiber aggregate which consists of 50 % of the weight of 6 denier x51mm PET fiber and 50 % of the weight (heart component: the arrival PET at Hara, arrival copolymerized polyester at Hara with a sheath component:melting point of 170 degrees C) of 6 denier x51mm conjugate fibers by which arrival at Hara was carried out to 5Gy of examples. The nonwoven fabric design layer was obtained. furthermore, 40 % of the weight of 40 denier x51mm PET fiber and a 3 denier x51mm conjugate fiber (heart component-ET --) Sheath component : The fiber aggregate which consists of 60 % of the weight of copolymerized polyester with a melting point of 170 degrees C is nonwoven-fabric-ized by the roller card machine. When laminating with a cross wrapper and considering as a base material layer, after carrying out the coincidence injection of the above-mentioned arrival nonwoven fabric design layer at Hara produced with another object and compressing into convention thickness, the temporary Plastic solid with a surface density 0.5 kg/m² and a thickness of 50mm was acquired by heat-treating at 180 degrees C. The temporary Plastic solid acquired by the above was heated at the temperature of 210 more degrees C, pressing was carried out with the cold press, and the Plastic solid with a thickness of 50mm was acquired.

[0034] It is surface density 100 g/m² by carrying out needle punch of the fiber aggregate which consists of 70 % of the weight of 2 denier x51mm PET fiber and 30 % of the weight (heart component: the arrival PET at Hara, arrival copolymerized polyester at Hara with a sheath component:melting point of 170 degrees C) of 2 denier x51mm conjugate fibers by which arrival at Hara was carried out to 6Gy of examples. The nonwoven fabric design layer was obtained. furthermore, 50 % of the weight of 1.5 denier x51mm PET fiber and a 1.5 denier

x51mm conjugate fiber (heart component: -- the arrival PET at Hara --) Sheath component : The fiber aggregate which consists of 50 % of the weight of arrival copolymerized polyester at Hara with a melting point of 170 degrees C is nonwoven-fabric-ized by the roller card machine. When laminating with a cross wrapper and considering as a base material layer, after carrying out the coincidence injection of the above-mentioned arrival nonwoven fabric design layer at Hara produced with another object and compressing into convention thickness, the temporary Plastic solid with a surface density 1.0 kg/m² and a thickness of 30mm was acquired by heat-treating at 180 degrees C. The temporary Plastic solid acquired by the above was heated at the temperature of 210 more degrees C, pressing was carried out with the cold press, and the Plastic solid with a thickness of 1mm was acquired.

[0035] It is surface density 100 g/m² by carrying out needle punch of the fiber aggregate which consists of 50 % of the weight of 2 denier x51mm PET fiber and 50 % of the weight (heart component: the arrival PET at Hara, arrival copolymerized polyester at Hara with a sheath component:melting point of 170 degrees C) of 3 denier x51mm conjugate fibers by which arrival at Hara was carried out to 7Gy of examples. The nonwoven fabric design layer was obtained. furthermore, 50 % of the weight of 13 denier x51mm PET fiber and a 2 denier x51mm conjugate fiber (heart component-ET --) Sheath component : The fiber aggregate which consists of 50 % of the weight of copolymerized polyester with a melting point of 170 degrees C is nonwoven-fabric-ized by the roller card machine. When laminating with a cross wrapper and considering as a base material layer, after carrying out the coincidence injection of the above-mentioned arrival nonwoven fabric design layer at Hara produced with another object and compressing into convention thickness, the temporary Plastic solid with a surface density 1.0 kg/m² and a thickness of 30mm was acquired by heat-treating at 180 degrees C. The temporary Plastic solid acquired by the above was heated at the temperature of 210 more degrees C, pressing was carried out with the cold press, and the Plastic solid with a thickness of 20mm was acquired.

[0036] It is surface density 100 g/m² by carrying out needle punch of the fiber aggregate which consists of 50 % of the weight of 2 denier x51mm PET fiber and 50 % of the weight (heart component-ET, the sheath component: copolymerized polyester with a melting point of 170 degrees C) of 3 denier x51mm conjugate fibers by which arrival at Hara was carried out to 8Gy of examples. The nonwoven fabric design layer was obtained. furthermore, 50 % of the weight of 13 denier x51mm PET fiber and a 2 denier x51mm conjugate fiber (heart component-ET --) Sheath component : The fiber aggregate which consists of 50 % of the weight of copolymerized polyester with a melting point of 170 degrees C is nonwoven-fabric-ized by the roller card machine. By compressing into convention thickness and heat-treating at 180 more degrees C, after carrying out the coincidence injection of the above-mentioned arrival nonwoven fabric design layer at Hara produced with another object and joining a design layer and a base material layer in needle punch, in case it laminates with a cross wrapper and considers as a base material layer The temporary Plastic solid with a surface density 1.0 kg/m² and a thickness of 30mm was acquired. The temporary Plastic solid acquired by the above was heated at the temperature of 210 more degrees C, pressing was carried out with the cold press, and the Plastic solid with a thickness of 20mm was acquired.

[0037] It is surface density 10 g/m² by carrying out needle punch of the fiber aggregate which consists of 50 % of the weight of 2 denier x51mm PET fiber and 50 % of the weight (heart component-ET, the sheath component: copolymerized polyester with a melting point of 170 degrees C) of 3 denier x51mm conjugate fibers by which arrival at Hara was carried out to 1Gy of examples of a comparison. The nonwoven fabric design layer was obtained. furthermore, 50 % of the weight of 13 denier x51mm PET fiber and a 2 denier x51mm conjugate fiber (heart component-ET --) Sheath component : The fiber aggregate which consists of 50 % of the weight of copolymerized polyester with a melting point of 170 degrees C is nonwoven-fabric-ized by the roller card machine. When laminating with a cross wrapper and considering as a base material layer, after carrying out the coincidence injection of the above-mentioned arrival nonwoven fabric design layer at Hara produced with another object and compressing into convention thickness, the temporary Plastic solid with a surface density 1.0 kg/m² and a thickness of 30mm was acquired by heat-treating at 180 degrees C. The temporary Plastic solid acquired by the above was heated at the temperature of 210 more degrees C, pressing was carried out with the cold press, and the Plastic solid with a thickness of 20mm was acquired.

[0038] It is surface density 100 g/m² by carrying out needle punch of the fiber aggregate which consists of 50 % of the weight of 20 denier x51mm PET fiber and 50 % of the weight (heart component-ET, the sheath component: copolymerized polyester with a melting point of 170 degrees C) of 20 denier x51mm conjugate fibers by which arrival at Hara was carried out to 2Gy of examples of a comparison. The nonwoven fabric design layer was obtained. furthermore, 50 % of the weight of 15 denier x51mm PET fiber and a 2 denier x51mm conjugate fiber (heart component-ET --) Sheath component : The fiber aggregate which consists of 50 % of the weight of copolymerized polyester with a melting point of 170 degrees C is nonwoven-fabric-ized by the roller

card machine. When laminating with a cross wrapper and considering as a base material layer, after carrying out the coincidence injection of the above-mentioned arrival nonwoven fabric design layer at Hara produced with another object and compressing into convention thickness, the temporary Plastic solid with a surface density 1.0 kg/m² [2] and a thickness of 30mm was acquired by heat-treating at 180 degrees C. The temporary Plastic solid acquired by the above was heated at the temperature of 210 more degrees C, pressing was carried out with the cold press, and the Plastic solid with a thickness of 20mm was acquired.

[0039] It is surface density 100 g/m² by carrying out needle punch of the fiber aggregate which consists of 50 % of the weight of 2 denier x51mm PET fiber and 50 % of the weight (heart component-ET, the sheath component: copolymerized polyester with a melting point of 170 degrees C) of 3 denier x51mm conjugate fibers by which arrival at Hara was carried out to 3Gy of examples of a comparison. The nonwoven fabric design layer was obtained. furthermore, 50 % of the weight of 60 denier x51mm PET fiber and a 25 denier x51mm conjugate fiber (heart component-ET --) Sheath component : The fiber aggregate which consists of 50 % of the weight of copolymerized polyester with a melting point of 170 degrees C is nonwoven-fabric-ized by the roller card machine. When laminating with a cross wrapper and considering as a base material layer, after carrying out the coincidence injection of the above-mentioned arrival nonwoven fabric design layer at Hara produced with another object and compressing into convention thickness, the temporary Plastic solid with a surface density 1.0 kg/m² [2] and a thickness of 30mm was acquired by heat-treating at 180 degrees C. The temporary Plastic solid acquired by the above was heated at the temperature of 210 more degrees C, pressing was carried out with the cold press, and the Plastic solid with a thickness of 20mm was acquired. However, when it did not have desired rigidity but it was used as interior material for automobiles, configuration maintenance was difficult for the above-mentioned nonwoven fabric.

[0040] It is surface density 50 g/m² by carrying out needle punch of the fiber aggregate which consists of 50 % of the weight of 2 denier x51mm PET fiber and 50 % of the weight (heart component-ET, the sheath component: copolymerized polyester with a melting point of 170 degrees C) of 3 denier x51mm conjugate fibers by which arrival at Hara was carried out to 4Gy of examples of a comparison. The nonwoven fabric design layer was obtained. furthermore, 50 % of the weight of 13 denier x51mm PET fiber and a 2 denier x51mm conjugate fiber (heart component-ET --) Sheath component : The fiber aggregate which consists of 50 % of the weight of copolymerized polyester with a melting point of 170 degrees C is nonwoven-fabric-ized by the roller card machine. When laminating with a cross wrapper and considering as a base material layer, after carrying out the coincidence injection of the above-mentioned arrival nonwoven fabric design layer at Hara produced with another object and compressing into convention thickness, the temporary Plastic solid with a surface density 0.5 kg/m² [2] and a thickness of 80mm was acquired by heat-treating at 180 degrees C. The temporary Plastic solid acquired by the above was heated at the temperature of 210 more degrees C, pressing was carried out with the cold press, and the Plastic solid with a thickness of 60mm was acquired.

[0041] It is surface density 100 g/m² by carrying out needle punch of the fiber aggregate which consists of 50 % of the weight of 2 denier x51mm PET fiber and 50 % of the weight (heart component-ET, the sheath component: copolymerized polyester with a melting point of 170 degrees C) of 3 denier x51mm conjugate fibers by which arrival at Hara was carried out to 5Gy of examples of a comparison. The nonwoven fabric design layer was obtained. furthermore, 50 % of the weight of 13 denier x51mm PET fiber and a 2 denier x51mm conjugate fiber (heart component-ET --) Sheath component : The fiber aggregate which consists of 50 % of the weight of copolymerized polyester with a melting point of 170 degrees C is nonwoven-fabric-ized by the roller card machine. When laminating with a cross wrapper and considering as a base material layer, after carrying out the coincidence injection of the above-mentioned arrival nonwoven fabric design layer at Hara produced with another object and compressing into convention thickness, the temporary Plastic solid with a surface density 2.6 kg/m² [2] and a thickness of 30mm was acquired by heat-treating at 180 degrees C. The temporary Plastic solid acquired by the above was heated at the temperature of 210 more degrees C, pressing was carried out with the cold press, and the Plastic solid with a thickness of 0.5mm was acquired.

[0042] It is surface density 100 g/m² by carrying out needle punch of the fiber aggregate which consists of 50 % of the weight of 2 denier x51mm PET fiber and 50 % of the weight (heart component-ET, the sheath component: copolymerized polyester with a melting point of 170 degrees C) of 3 denier x51mm conjugate fibers by which arrival at Hara was carried out to 6Gy of examples of a comparison. The nonwoven fabric design layer was obtained. furthermore, 50 % of the weight of 1 denier x51mm PET fiber and a 1.5 denier x51mm conjugate fiber (heart component-ET --) Sheath component : The fiber aggregate which consists of 50 % of the weight of copolymerized polyester with a melting point of 170 degrees C is nonwoven-fabric-ized by the roller card machine. When laminating with a cross wrapper and considering as a base material layer, after carrying out the coincidence injection of the above-mentioned arrival nonwoven fabric design layer at Hara produced with

another object and compressing into convention thickness, the temporary Plastic solid with a surface density 1.0 kg/m² and a thickness of 30mm was acquired by heat-treating at 180 degrees C. The temporary Plastic solid acquired by the above was heated at the temperature of 210 more degrees C, pressing was carried out with the cold press, and the Plastic solid with a thickness of 20mm was acquired. However, when it did not have desired rigidity but it was used as interior material for automobiles, configuration maintenance was difficult for the above-mentioned nonwoven fabric.

[0043] Conventional example 1 apparent-density-gravity 0.3 g/cm³ The felt of phenol resin sinking in is used as a base material layer, laminating structuring of what used the hot melt film of 75-micrometer thickness as an epidermis design layer as adhesives of a needle punch nonwoven fabric, a design layer, and a base material layer is carried out, and they are 140 degrees C and 50kg/cm². Hot press shaping was carried out and the interior material for automobiles with a thickness of 5mm was obtained.

[0044] Conventional example 2 apparent-density-gravity 0.3 g/cm³ The felt of phenol resin sinking in is used as a base material layer, laminating structuring of what used the hot melt film of 75-micrometer thickness as adhesives of tricot epidermis, this design layer, and a base material layer as an epidermis design layer is carried out, and they are 140 degrees C and 50kg/cm². Hot press shaping was carried out and the interior material for automobiles with a thickness of 5mm was obtained.

[0045] Conventional example 3 apparent-density-gravity 0.1g/cm³ The laminating structure containing polyphenylene oxide foam is used as the base material layer B, laminating structuring of what used the hot melt film of 50-micrometer thickness as a design layer as adhesives of needle punch nonwoven fabric epidermis, this design layer, and a base material layer is carried out, and they are heating and 50kg/cm² at 160 degrees C. Press forming was carried out and the interior material for automobiles with a thickness of 6mm was obtained.

[0046] About the interior material for automobiles obtained in the example of trial above-mentioned examples 1-8, the examples 1-6 of a comparison, and the conventional examples 1-3, according to the aforementioned approach, normal incidence sound absorption coefficient measurement was carried out, and absorption-of-sound nature was judged. Furthermore, about the fine sight after shaping, and tactile feeling, organic-functions evaluation was performed, it measured by the abrasion test about abrasion resistance, and the result obtained, respectively was shown in Table 1 with the contents of a sample.

[0047]

[Table 1]

| | 意 匠 層 | | | | | 配合比 (wt%) | 基 材 層 | | | | | 配合比 (wt%) | 厚み (mm) | 平均密度 (g/cm ³) | 美観 | 触感 | 吸音性 | 機械的強度 | 耐摩耗性 | 比較対象例 | |
|------|-----------------|-------------|--------------|-------------|-----------|------------------------|--------------|-------------|--------------|-------------|-----------|--------------|------------|------------------------------|----|----|-----|-------|------|-------|------|
| | 7H+72繊維 | | バインダー繊維 | | | | 7H+72繊維 | | バインダー繊維 | | | | | | | | | | | | |
| | 含有量 (wt%) | 繊維 (7-9) | 含有量 (wt%) | 繊維 (7-9) | 融点 (℃) | | 含有量 (wt%) | 繊維 (7-9) | 含有量 (wt%) | 繊維 (7-9) | 融点 (℃) | | | | | | | | | | |
| 実施例1 | 50 | 2 | 50 | 3 | 170 | 3 | 50 | 13 | 50 | 2 | 170 | 97 | 20 | 0.05 | ○ | ◎ | ◎ | ◎ | ◎ | 従来例1 | |
| 実施例2 | 50 | 15 | 50 | 15 | 170 | 10 | 50 | 15 | 50 | 2 | 170 | 90 | 20 | 0.05 | ○ | ◎ | ◎ | ◎ | ◎ | 従来例1 | |
| 実施例3 | 70 | 0.2 | 30 | 1.5 | 130 | 5 | 50 | 13 | 50 | 3 | 170 | 95 | 20 | 0.05 | ◎ | ◎ | ◎ | ◎ | ◎ | 従来例1 | |
| 実施例4 | 50 | 15 | 50 | 15 | 170 | 100 | - | - | - | - | - | 0 | 20 | 0.05 | ○ | ◎ | ◎ | ◎ | ◎ | 従来例1 | |
| 実施例5 | 50 | 6 | 50 | 6 | 170 | 50 | 40 | 40 | 60 | 3 | 170 | 50 | 50 | 0.01 | ○ | ◎ | ◎ | ◎ | ◎ | 従来例1 | |
| 実施例6 | 70 | 2 | 30 | 2 | 170 | 10 | 50 | 1.5 | 50 | 1.5 | 170 | 90 | 1 | 1 | ○ | ○ | ○ | ◎ | ◎ | 従来例1 | |
| 実施例7 | 50 | 2 | 50 | 3 | 170 | 10 | 50 | 13 | 50 | 2 | 170 | 90 | 20 | 0.05 | ○ | ◎ | ◎ | ◎ | ◎ | 従来例1 | |
| 実施例8 | 50 | 2 | 50 | 3 | 170 | 10 | 50 | 13 | 50 | 2 | 170 | 90 | 20 | 0.05 | ○ | ◎ | ◎ | ◎ | ◎ | 従来例1 | |
| 比較例1 | 50 | 2 | 50 | 3 | 170 | 1 | 50 | 13 | 50 | 2 | 170 | 90 | 20 | 0.05 | ○ | ◎ | ◎ | ◎ | ◎ | 従来例1 | |
| 比較例2 | 50 | 20 | 50 | 20 | 170 | 10 | 50 | 15 | 50 | 2 | 170 | 90 | 20 | 0.05 | △ | ◎ | ◎ | ◎ | △ | 従来例1 | |
| 比較例3 | 50 | 2 | 50 | 3 | 170 | 10 | 50 | 60 | 50 | 25 | 170 | 90 | 20 | 0.05 | ○ | ◎ | ◎ | ◎ | ◎ | 従来例1 | |
| 比較例4 | 50 | 2 | 50 | 3 | 170 | 10 | 50 | 13 | 50 | 2 | 170 | 90 | 60 | 0.006 | △ | ◎ | ◎ | ◎ | ◎ | 従来例1 | |
| 比較例5 | 50 | 2 | 50 | 3 | 170 | 10 | 50 | 13 | 50 | 2 | 170 | 90 | 0.5 | 1.3 | △ | △ | ○ | ◎ | ◎ | 従来例1 | |
| 比較例6 | 50 | 2 | 50 | 3 | 170 | 10 | 50 | 1 | 50 | 1.5 | 170 | 90 | 20 | 0.05 | ○ | ◎ | ◎ | ◎ | ◎ | 従来例1 | |
| 従来例1 | ニードルパンチ不織布製皮 | | | | | レジンフェルト | | | | | | | 5 | 0.3 | - | - | - | - | - | - | - |
| 従来例2 | トリコット+スラブウレタン製皮 | | | | | レジンフェルト | | | | | | | 5 | 0.3 | ◎ | ◎ | ○ | × | ◎ | - | - |
| 従来例3 | ニードルパンチ不織布製皮 | | | | | ポリフェニレンオキシド発泡体を含む積層構造体 | | | | | | | 6 | 0.1 | ○ | △ | ○ | ○ | ○ | ○ | 従来例1 |

◎: 良好, ○: 同等, △: やや劣る, ×: 劣る

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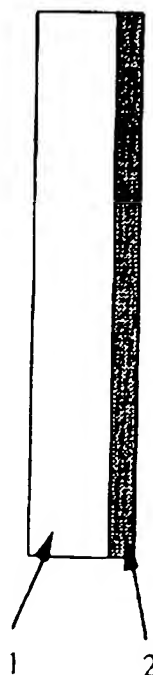
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(54) 【発明の名称】 自動車用内装材およびその製造方法

(57) 【要約】

【目的】 高い吸音性と剛性を併有し、良好な触感、優れた美観を備えた自動車用内装材を、簡素化された工程で経済的有利に提供すること。

【構成】 全体として熱可塑性合成繊維の短繊維よりなる吸音性不織布で構成され、その少なくとも一方の表面を含む構成繊維が着色されて不織布意匠層を形成した自動車用内装材であって、該意匠層は保形性増強用不織布基材層と一体的に積層されてもよい。



【特許請求の範囲】

【請求項1】 少なくとも一方の表面を含む構成繊維が着色されて不織布意匠層を形成すると共に、該意匠層と一体的に積層された保形性増強用不織布基材層を含むことができ、全体として熱可塑性合成繊維の短繊維よりなる吸音性不織布を含んで構成されたことを特徴とする自動車用内装材。

【請求項2】 前記意匠層と基材層の重量比が3:97~100:0である請求項1の自動車用内装材。

【請求項3】 前記意匠層を構成する短繊維の平均繊維度が0.2~15デニールであり、前記基材層を構成する短繊維の平均繊維度が1.5~40デニールである請求項1または2の自動車用内装材。

【請求項4】 全体としての吸音性不織布が成形後において1~50mmの平均厚みと0.01~1.0g/cm³の平均の見かけ密度を有する請求項1、2または3の自動車用内装材。

【請求項5】 前記意匠層を構成する短繊維が染色若しくは、紡糸前に原着することにより着色されたものである請求項1~4の何れか1項の自動車用内装材。

【請求項6】 前記熱可塑性合成繊維がポリエステル系繊維である請求項1~5の何れか1項の自動車用内装材。

【請求項7】 前記熱可塑性合成繊維の短繊維が、高軟化点ポリエステル系ステープル（繊維A）5~80重量%と上記繊維Aよりも少なくとも20℃低い軟化点を有する低軟化点ポリエステル系ステープル（繊維B）20~95重量%とを主として含む少なくとも2種の短繊維よりなり、該繊維Bとそれに接触する構成繊維との交点の少なくとも一部が融着されてなり、前記吸音性不織布が0.01~1.0g/cm³の平均見掛け密度を有し、90℃における曲げ弾性勾配の保持率が少なくとも30%である請求項1~6の何れか1項の自動車用内装材。

【請求項8】 前記繊維Aは高軟化点ポリエチレンテレフタレートより形成され、前記繊維Bは少なくともその外周部が繊維Aよりも20~120℃低い軟化点を有する変性ポリエステルより形成されてなる請求項7の自動車用内装材。

【請求項9】 前記繊維Bが原着された前記高軟化点ポリエチレンテレフタレートを芯成分とし、それよりも20~120℃低い軟化点を有する原着された変性ポリエステルを鞘成分とする芯鞘型コンジュゲート繊維である請求項8の自動車用内装材。

【請求項10】 前記繊維Bが繊維Aよりも20~120℃低い軟化点を有する変性ポリエステルより形成された単一成分繊維である請求項8の自動車用内装材。

【請求項11】 前記変性ポリエステルは200℃以下の融点と、少なくとも6cal/gの融解熱を有する結晶性低融点ポリエステルである請求項8、9または10

の自動車用内装材。

【請求項12】 前記変性ポリエステルが150~200℃の融点を有する請求項11の自動車用内装材。

【請求項13】 着色された熱可塑性合成繊維よりなる意匠層用短繊維ウェブとそれとは別体に作製された前記と同種の着色または非着色熱可塑性合成繊維よりなる基材層用短繊維ウェブとを積層し、両者をニードルパンチングおよび/または加熱接着により接合一体化することを特徴とする自動車用内装材の製造方法。

10 【請求項14】 複数のクロスレイヤーを連続的に用い、最外層ウェブ供給用を含む少なくとも1台のクロスレイヤーから着色された意匠層用短繊維ウェブを供給する請求項13の自動車用内装材の製造方法。

【請求項15】 前記意匠層用短繊維ウェブと基材層用短繊維ウェブの重量比が3:97~100:0である請求項13または14の自動車用内装材の製造方法。

20 【請求項16】 前記意匠層用短繊維の平均繊維度が0.2~15デニールであり、前記基材層用短繊維の平均繊維度が1.5~40デニールである請求項13~15の何れか1項の自動車用内装材の製造方法。

【請求項17】 前記一体化後、更に成形して全体として1~50mmの平均厚みと0.01~1.0g/cm³の平均の見かけ密度を有する吸音性不織布となすことを特徴とする請求項13~16の何れか1項の自動車用内装材の自動車用内装材の製造方法。

【請求項18】 前記熱可塑性合成繊維の短繊維が、熱融着性繊維を含む少なくとも2種の短繊維よりなる請求項13~17の何れか1項の自動車用内装材の自動車用内装材の製造方法。

30 【請求項19】 前記熱可塑性合成繊維がポリエチレンテレフタレート系繊維である請求項13~18の何れか1項の自動車用内装材の製造方法。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は自動車用内装材、特に、吸音特性、触感、審美性等の外観品質等において優れた機能を有し、形状維持のために高い剛性を必要とする部位、例えば、ドアトリム、ヘッドライニング、トランクトリム、ダッシュインシュレータ等に好適に適用される自動車用内装材に関する。

【0002】

【従来の技術】近年、自動車の高級化、高性能化に伴い、車室内の静粛性および内装材の触感および審美性の向上等が要求されている。然し乍ら、従来の自動車用内装材は、一般に安価であることを重要視するの余り、吸音・遮音、触感、審美性等の付加的機能が兎角等閑視され、これらの優れた付加的機能を兼備したものが少なかった。即ち、従来は、形状を保持するための単に剛性の高いパネル等の基材部分に対して表皮、例えば不織布、エラストマー、織布などの吸音材料を貼り付けた構成

のものが自動車用内装材の主流を占めて来た。それら基材部分の典型例としては、木質ボードや、再生繊維にフェノール樹脂等の熱硬化型バインダーを使用したフェルト、またはガラス繊維等の無機繊維に熱可塑性樹脂を含浸し熱間プレスや冷間プレスした所謂FRTP、或いはサンドイッチ構造となした発泡材料等を用いて作製したパネルが挙げられる。しかしながら、当然これらの基材よりなるものは形状維持効果を発揮するものの、吸音性能の低下は免れず、更に、表面風合い、触感等、上記の付加的機能を殆ど有しないのみならず、構成が複雑となり、工程も増加するという問題点もあった。このように、従来の自動車用内装材においては、良好な吸音性能を有する繊維集合体は剛性不足により形状維持が困難であり、形状維持のために剛性を増大すると吸音性能が著しく低下するという二律背反に常に遭遇すると同時に、更に以下の欠点があった。

【0003】第1に、リサイクル性がないことである。これは基材が、層毎の材料の相違する多層構造であることに加えて基材と表皮部分とでも材料が相違することに起因している。

【0004】第2に、従来、フェルトや木質ボード等において剛性を上げるために用いられていたフェノール樹脂が不快臭を放つことである。自動車用内装材として用いる場合の不快臭は実用上大きな問題とされ、当然代替材料が求められていた。

【0005】第3に、従来の材料は車両に組付けられた状態において、車体の剛性パネルと干渉し合う異音を発生する可能性が高かった。これを解決するために内装材の基材とパネル面、または、他部品との干渉面に柔軟な不織布や発泡ウレタンを挟み込む工夫を必要としたため、余分な工数、部品を要して、経済的不利を免れなかった。

【0006】第4に、基材として板状のものをを使用するため、通気性を確保することが困難であり、十分な吸音性能を付与することができなかった。

【0007】本発明者等は、これらの欠点を解消するために、繊維度や軟化点温度の特定された異種の合成繊維ステープルを含み、平均見掛け密度や曲げ弾性勾配の特定された繊維集合体を含んで構成された自動車用内装材を特願平6-245269号として提案した。この繊維集合体を基材として用いた場合、多くの付加的機能が得られるが、最終的に美観を付与した内装材製品とするには、この基材と別個に作製した表皮を再び、例えば熱融着フィルム等を用いて貼り付けなければならず、そのための工程を必要とするという問題点があることが判明した。

【0008】

【発明が解決しようとする課題】本発明は、このような従来の問題点に着目してなされたもので、より高い吸音性と剛性を併有し、良好な触感、優れた美観等多くの

付加的品質機能を備え、更に単純な構成になる自動車用内装材を、より簡素化された工程で経済的有利に提供することを目的とするものである。

【0009】

【課題を解決するための手段】本発明者らは、繊維集合体、特に不織布、の機能、配合による性能を解析し、その剛性および付加的機能を高める手法を見だし、本発明を完成させるに至った。即ち、前記問題点を解決するために、繊維配合および配合される繊維種を従来のものと比較して、剛性を得ることが可能なものとし、更に付加的機能とも両立できる構成とした。更にまた、高軟化点繊維と低軟化点繊維の配合比と繊維集合体に配合される低軟化点繊維種を特定することにより、高剛性と、少なくとも一方の表面が染色、若しくは原着等によって着色された意匠層を有し、その意匠層が内装材の表皮としての機能を有すると共に、必要に応じてそれに保形性増強用の基材層を一体化することにより高い付加的機能を有する自動車用内装材を提供することに成功した。

【0010】即ち、本発明に係る自動車用内装材は、図1に示すごとく、少なくとも一方の表面を含む構成繊維が着色されて不織布意匠層2を形成すると共に、該意匠層2と一体的に積層された保形性増強用不織布基材層1を含むことができ、全体として熱可塑性合成繊維の短繊維よりなる吸音性不織布を含んで構成されたことを特徴とする。

【0011】前記意匠層2と基材層1の重量比は、好ましくは3:97~100:0である。意匠層の重量比が3重量%未満の場合は、表面の着色意匠層が非常に薄く、且つ低密度のものとなってしまうため、基材層が非着色の場合、それが表面に透けて見え、審美性を頗る悪化させてしまう。また、意匠層の着色部が基材層全体に及び100重量%の構成比率となることに関しては、審美性、剛性の面において何ら問題を生じない。

【0012】意匠層2を構成する短繊維の平均繊維度は0.2~15デニールの範囲にあることが好ましい。平均繊維度が0.2デニール未満では紡糸速度の低下による生産性の減少、または、不織布化する際のウェブ化の困難さから品質の良い不織布が得られにくい。また、15デニール超の場合は、表面の毛羽立ちにより平滑性が得られにくく、表面の肌理の粗さ等の点で、良好な表面品質を期待し難い。

【0013】また、基材層1を構成する短繊維の平均繊維度は1.5~40デニールの範囲にあることが好ましい。平均繊維度が1.5デニール未満の場合は、繊維自体の剛性が小さいため、基材として十分な剛性を得ることが困難となる。また、40デニール超の場合、不織布中の単位体積当たりの繊維総本数が少なくなり、後述のバインダー繊維との接合点が減少し、十分な剛性を得ることが望めなくなる。また、繊維径が大きくなることにより、表面積/断面積の比が小さくなるため、効率良く音

のエネルギーを吸収することが困難となる。

【0014】このような構成により、全体として優れた吸音性を有する本発明の不織布は1～50mmの平均厚みに成形することがよい。平均厚みが1mm未満の場合は、厚み不足による曲げ剛性の低下が否めず、また、剛性を確保できた場合においても所望の通気量が得られず、内装材に所期の吸音性能を付与することが困難となる。更に、成形時の作用圧力等により、表面の風合い、美観を損なう恐れもある。50mmを越えると、基材自体の剛性を得ることが困難であり、保形性能が劣る。

【0015】本発明における不織布の平均見掛け密度は、0.01～1.0g/cm³であることが好ましく、0.01g/cm³未満においては、単位体積当たりの繊維本数が少ないため、不織布として十分な剛性を得ることが困難であると共に、所望の通気抵抗が得られず、十分な吸音性能を得難い。平均見掛け密度が1.0g/cm³より高い状態では、不織布が硬すぎて、従来のパネル、ボードと実質的に変わるところがなく、付加的機能を期待することが困難となる。

【0016】使用される繊維としては、ポリアミド、共重合ポリアミド、ポリエステル、共重合ポリエステル、ポリアクリロニトリル、共重合ポリアクリロニトリル、ポリオレフィン、ポリ塩化ビニル、ポリ塩化ビニリデン、ポリクラルール等の熱可塑性重合体を単独、混合若しくは複合紡糸して得られる繊維が挙げられる。繊維種の中では、結晶融点(T_m)が高いこと、比較的安価であることから考えて、ポリエステル系繊維、特に入手容易なポリエチレンテレフタレート系繊維は融点や引張強度、モジュラスが比較的高く骨格繊維としての支持機能を有効に果たすので好ましい。更に、ホモポリエステルと共重合ポリエステルとを繊維軸に沿って偏心的に複合したサイド・バイ・サイド型または芯鞘型コンジュゲート繊維は熱処理により捲縮を発現し不織布の交絡度を高め成形性が増すので好ましい。

【0017】本発明の自動車用内装材の不織布を構成する熱可塑性合成繊維の短繊維は、好ましくは、熱融着性繊維を含む少なくとも2種の短繊維よりなる。即ち、この不織布は、高軟化点の剛性繊維ステープル、即ちマトリックス繊維(繊維A)5～80重量%と上記繊維Aよりも少なくとも20℃低い軟化点を有する低軟化点合成繊維ステープル、即ちバインダー繊維(繊維B)95～20重量%とを主たる構成繊維とし、該繊維Bとそれに接触する構成繊維との交点の少なくとも一部が融着され且つ、90℃における曲げ弾性勾配の保持率が少なくとも30%であることが好ましい。

【0018】繊維A、即ち、マトリックス繊維が5重量%未満の場合、全体に占める低軟化点繊維の比率が大きくなり過ぎ、高温時の十分な剛性を得ることが困難となる。また、80重量%超の場合、バインダー繊維の比率

が小さく、繊維間の接合点が少なくなるため、十分な剛性及び凝集性、成形性を得ることが困難である。

【0019】繊維B、即ち、バインダー繊維が20重量%未満の場合、上記同様十分な接合点が得られず、剛性低下や成形性、凝集性の不良等を引き起こす可能性がある。また、95重量%超の場合、ほぼ全てが低軟化点繊維で構成されるため、高温時に十分な剛性を確保することが困難となる。

【0020】不織布の結合材として、芯成分の融点に対して鞘成分の融点が20～120℃低い芯鞘構造を有するポリエステル系コンジュゲート繊維若しくは前記高軟化点繊維に対して20～120℃低い軟化点を有する低融点ポリエステル単一成分繊維の短繊維(繊維B)が好ましい。この理由は、結合材とマトリックス繊維の混合を均一にするためと、かかる不織布の形状をより強固に保持するためである。結合材として粉末状樹脂を使用した場合、結合材が局部的に固まりやすく、また、溶液型樹脂を使用した場合、主たる構成繊維の繊維径が低いとき、繊維表面に均一に付着することにより繊維径の増大を招く恐れがある。また、融点差が20℃未満の場合、マトリックス繊維Aの融点と近すぎる為、結合材を融解させて接着を行う成形工程において、結合材のみでなく、不織布全体が軟化または融解する恐れがある。融点差が120℃超の場合、熔融開始温度が低いため、高温時に十分な剛性を確保することが困難となる。従って、低軟化点繊維の融点は150～200℃であることが望ましい。

【0021】上記高温時に十分な剛性を確保するためには、低軟化点繊維の中心部(芯部)がポリエチレンテレフタレートホモポリマーであるのに対して、周辺部(鞘部)は融点が200℃以下で且つ、融解熱が少なくとも6cal/gで好ましくは少なくとも8cal/gである結晶性低融点変性ポリエステルコンジュゲート繊維、若しくは結晶性低融点変性ポリエステルから構成される単成分繊維であることが好ましい。通常、低融点ポリエステルは、非晶性であり融解熱を有しないが、本発明に好適な結晶性低融点変性ポリエステルは、8cal/g以上の融解熱を有しており、芯鞘型コンジュゲート繊維においても6cal/g以上の融解熱を持つものである。また、成形後結晶化した低融点成分は、非晶性低融点成分に比べ、熱的に安定なものであり、90℃における曲げ弾性勾配保持率が30%以上の耐熱性を有するものである。これらのコンジュゲート繊維または単成分繊維の構成成分としては、原着されたポリマーを用いることが最も好ましい。

【0022】本発明の自動車用内装材の不織布は、上記のように、マトリックス繊維(繊維A)とバインダー繊維(繊維B)を含む少なくとも2種の短繊維よりなり、成形可能となすことにより、保形性が増大し、形状が安定すると共に、表面の平滑性、毛羽立ち防止、審美性が

向上し、更に意図的に表面に凹凸等の意匠性を有する形状を付与することが可能となる。

【0023】構成繊維の横断面形状に関しては、レギュラーの円形、或いは偏平形、Y形、中空形等の異形等、特に制限はない。また、マトリックス繊維としても、サイド・バイ・サイド型或いは芯鞘型等のコンジュゲート化された潜在捲縮性繊維等を適宜に用いることができる。

【0024】本発明の自動車用内装材は、意匠層として原着または染色等、好ましくは原着によって着色された熱可塑性合成繊維よりなる短繊維ウェブと、それとは別体10に作製された前記と同種の着色または非着色熱可塑性合成繊維よりなる基材層用短繊維ウェブとを積層し、両者をニードルパンチングおよび/または加熱接着により一体化することにより作製することができる。また、上記一体化後、得られた不織布を更に加熱成形して全体として1~50mmの平均厚みと0.01~1.0g/cm³の平均の見かけ密度を有する吸遮音性不織布となすことがよい。

【0025】この場合、意匠層と基材層の構成繊維の繊維種、配合、色彩が同一の場合は両層は区別されない一体の層となるため、意匠層100%よりなる内装材とい10うことができ、このような単一構造で意匠層としての機能および、全体としての吸遮音性等の付加的機能を有する限り本発明の自動車用内装材として有用である。

【0026】また、上記製造法的好適な具体例は、複数のクロスレイヤーを連続的に用い、最外層ウェブ供給用を含む少なくとも1台のクロスレイヤーから着色された意匠層用短繊維ウェブを供給し、その後全体をニードルパンチングにより一体化し、必要に応じてヒートセット30する方法である。この方法は、連続工程による量産を可能とする。

【0027】以上のように、本発明方法により、吸遮音、触感、審美性等の付加的機能に優れ、形状維持等の本来の機能をも併せ備えた自動車用内装材を、簡素化された工程を以て工業的容易に且つ経済的有利に提供することができる。

【0028】

【実施例】以下に本発明の効果と実施例とを示す。実施例、比較例及び従来例における各特性値の測定法は下記の方法によった。

(吸音性測定) 自動車用内装材のサンプルにつき「IS A1405「管内法による建築材料の垂直入射吸音率測定法」に基づいて吸音率を測定し、吸音性を判断した。サンプルサイズφ100mm、測定範囲125~1600Hz。

(摩耗試験) 自動車用内装材のサンプルにつき「ISK7204「摩耗輪によるプラスチックの摩耗試験方法」に基づいて摩耗性能を測定し、摩耗性能を判断した。荷重250gf、試験回数100回転。

【0029】実施例1

グレイに原着された2デニール×51mmのポリエチレンテレフタレート(以下PETという)繊維50重量%と3デニール×51mmのコンジュゲート繊維(芯成分:PET、鞘成分:融点170℃の共重合ポリエステル)50重量%から構成される繊維集合体をニードルパンチすることにより面密度30g/m²の不織布意匠層を得た。更に、13デニール×51mmのPET繊維50重量%と2デニール×51mmのコンジュゲート繊維(芯成分:PET、鞘成分:融点170℃の共重合ポリエステル)50重量%から構成される繊維集合体をローラカードマシンにて不織布化し、クロスラッパ10にて積層化し基材層とする際、別体で作製した上記原着不織布意匠層を同時投入し、規定厚みに圧縮した後、180℃で熱処理することにより、面密度1.0kg/m²、厚み30mmの仮成形体を得た。上記によって得られた仮成形体を更に210℃の温度で加熱し、コールドプレスにより加圧成形して厚み20mmの成形体を得た。

【0030】実施例2

グレイに原着された15デニール×51mmのPET繊維50重量%と15デニール×51mmのコンジュゲート繊維(芯成分:PET、鞘成分:融点170℃の共重合ポリエステル)50重量%から構成される繊維集合体をニードルパンチすることにより面密度100g/m²の不織布意匠層を得た。更に、15デニール×51mmのPET繊維50重量%と2デニール×51mmのコンジュゲート繊維(芯成分:PET、鞘成分:融点170℃の共重合ポリエステル)50重量%から構成される繊維集合体をローラカードマシンにて不織布化し、クロスラッパ10にて積層化し基材層とする際、別体で作製した上記原着不織布意匠層を同時投入し、規定厚みに圧縮した後、180℃で熱処理することにより、面密度1.0kg/m²、厚み25mmの仮成形体を得た。上記によって得られた仮成形体を更に210℃の温度で加熱し、コールドプレスにより加圧成形して厚み20mmの成形体を得た。

【0031】実施例3

グレイに原着された0.2デニール×51mmのPET繊維70重量%と1.5デニール×51mmのコンジュゲート繊維(芯成分:PET、鞘成分:融点130℃の共重合ポリエステル)30重量%から構成される繊維集合体をニードルパンチすることにより面密度50g/m²の不織布意匠層を得た。更に、13デニール×51mmのPET繊維50重量%と3デニール×51mmのコンジュゲート繊維(芯成分:PET、鞘成分:融点170℃の共重合ポリエステル)50重量%から構成される繊維集合体をローラカードマシンにて不織布化し、クロスラッパ10にて積層化し基材層とする際、別体で作製した上記原着不織布意匠層を同時投入し、規定厚みに圧縮した後、180℃で熱処理することにより、面密度1.5

9

0 kg/m²、厚み30mmの仮成形体を得た。上記によって得られた仮成形体を更に210℃の温度で加熱し、コールドプレスにより加圧成形して厚み20mmの成形体を得た。

【0032】実施例4

グレイに原着された15デニール×51mmのPET繊維50重量%と15デニール×51mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をローラカードマシンにて不織布化し、クロスラッパにて積層化し、規定厚みに圧縮した後、180℃で熱処理することにより、面密度1.0 kg/m²、厚み30mmの仮成形体を得た。上記によって得られた仮成形体を更に210℃の温度で加熱し、コールドプレスにより加圧成形して厚み20mmの成形体を得た。

【0033】実施例5

グレイに原着された6デニール×51mmのPET繊維50重量%と6デニール×51mmのコンジュゲート繊維（芯成分：原着PET、鞘成分：融点170℃の原着共重合ポリエステル）50重量%から構成される繊維集合体をニードルパンチすることにより面密度250 g/m²の不織布意匠層を得た。更に、40デニール×51mmのPET繊維40重量%と3デニール×51mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）60重量%から構成される繊維集合体をローラカードマシンにて不織布化し、クロスラッパにて積層化し基材層とする際、別体で作製した上記原着不織布意匠層を同時投入し、規定厚みに圧縮した後、180℃で熱処理することにより、面密度0.5 kg/m²、厚み50mmの仮成形体を得た。上記によって得られた仮成形体を更に210℃の温度で加熱し、コールドプレスにより加圧成形して厚み50mmの成形体を得た。

【0034】実施例6

グレイに原着された2デニール×51mmのPET繊維70重量%と2デニール×51mmのコンジュゲート繊維（芯成分：原着PET、鞘成分：融点170℃の原着共重合ポリエステル）30重量%から構成される繊維集合体をニードルパンチすることにより面密度100 g/m²の不織布意匠層を得た。更に、1.5デニール×51mmのPET繊維50重量%と1.5デニール×51mmのコンジュゲート繊維（芯成分：原着PET、鞘成分：融点170℃の原着共重合ポリエステル）50重量%から構成される繊維集合体をローラカードマシンにて不織布化し、クロスラッパにて積層化し基材層とする際、別体で作製した上記原着不織布意匠層を同時投入し、規定厚みに圧縮した後、180℃で熱処理することにより、面密度1.0 kg/m²、厚み30mmの仮成形体を得た。上記によって得られた仮成形体を更に210℃の温度で加熱し、コールドプレスにより加圧成形し

10

て、厚み1mmの成形体を得た。

【0035】実施例7

グレイに原着された2デニール×51mmのPET繊維50重量%と3デニール×51mmのコンジュゲート繊維（芯成分：原着PET、鞘成分：融点170℃の原着共重合ポリエステル）50重量%から構成される繊維集合体をニードルパンチすることにより面密度100 g/m²の不織布意匠層を得た。更に、13デニール×51mmのPET繊維50重量%と2デニール×51mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をローラカードマシンにて不織布化し、クロスラッパにて積層化し基材層とする際、別体で作製した上記原着不織布意匠層を同時投入し、規定厚みに圧縮した後、180℃で熱処理することにより、面密度1.0 kg/m²、厚み30mmの仮成形体を得た。上記によって得られた仮成形体を更に210℃の温度で加熱し、コールドプレスにより加圧成形して厚み20mmの成形体を得た。

【0036】実施例8

グレイに原着された2デニール×51mmのPET繊維50重量%と3デニール×51mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をニードルパンチすることにより面密度100 g/m²の不織布意匠層を得た。更に、13デニール×51mmのPET繊維50重量%と2デニール×51mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をローラカードマシンにて不織布化し、クロスラッパにて積層化して基材層とする際、別体で作製した上記原着不織布意匠層を同時投入し、ニードルパンチにて意匠層と基材層を接合した後、規定厚みに圧縮し、更に180℃で熱処理することにより、面密度1.0 kg/m²、厚み30mmの仮成形体を得た。上記によって得られた仮成形体を更に210℃の温度で加熱し、コールドプレスにより加圧成形して厚み20mmの成形体を得た。

【0037】比較例1

グレイに原着された2デニール×51mmのPET繊維50重量%と3デニール×51mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をニードルパンチすることにより面密度10 g/m²の不織布意匠層を得た。更に、13デニール×51mmのPET繊維50重量%と2デニール×51mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をローラカードマシンにて不織布化し、クロスラッパにて積層化し基材層とする際、別体で作製した上記原

11

着不織布意匠層を同時投入し、規定厚みに圧縮した後、180℃で熱処理することにより、面密度1.0kg/m²、厚み3.0mmの仮成形体を得た。上記によって得られた仮成形体を更に210℃の温度で加熱し、コールドプレスにより加圧成形して厚み2.0mmの成形体を得た。

【0038】比較例2

グレイに原着された20デニール×5.1mmのPET繊維50重量%と20デニール×5.1mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をニードルパンチすることにより面密度100g/m²の不織布意匠層を得た。更に、15デニール×5.1mmのPET繊維50重量%と2デニール×5.1mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をローラカードマシンにて不織布化し、クロスラッパにて積層化し基材層とする際、別体で作製した上記原着不織布意匠層を同時投入し、規定厚みに圧縮した後、180℃で熱処理することにより、面密度1.0kg/m²、厚み3.0mmの仮成形体を得た。上記によって得られた仮成形体を更に210℃の温度で加熱し、コールドプレスにより加圧成形して厚み2.0mmの成形体を得た。

【0039】比較例3

グレイに原着された2デニール×5.1mmのPET繊維50重量%と3デニール×5.1mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をニードルパンチすることにより面密度100g/m²の不織布意匠層を得た。更に、60デニール×5.1mmのPET繊維50重量%と25デニール×5.1mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をローラカードマシンにて不織布化し、クロスラッパにて積層化し基材層とする際、別体で作製した上記原着不織布意匠層を同時投入し、規定厚みに圧縮した後、180℃で熱処理することにより、面密度1.0kg/m²、厚み3.0mmの仮成形体を得た。上記によって得られた仮成形体を更に210℃の温度で加熱し、コールドプレスにより加圧成形して厚み2.0mmの成形体を得た。しかしながら、上記不織布は、所望の剛性を有せず、自動車用内装材として使用した場合、形状保持が困難であった。

【0040】比較例4

グレイに原着された2デニール×5.1mmのPET繊維50重量%と3デニール×5.1mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をニードルパンチすることにより面密度50g/m²の不織

12

布意匠層を得た。更に、13デニール×5.1mmのPET繊維50重量%と2デニール×5.1mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をローラカードマシンにて不織布化し、クロスラッパにて積層化し基材層とする際、別体で作製した上記原着不織布意匠層を同時投入し、規定厚みに圧縮した後、180℃で熱処理することにより、面密度0.5kg/m²、厚み8.0mmの仮成形体を得た。上記によって得られた仮成形体を更に210℃の温度で加熱し、コールドプレスにより加圧成形して厚み6.0mmの成形体を得た。

【0041】比較例5

グレイに原着された2デニール×5.1mmのPET繊維50重量%と3デニール×5.1mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をニードルパンチすることにより面密度100g/m²の不織布意匠層を得た。更に、13デニール×5.1mmのPET繊維50重量%と2デニール×5.1mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をローラカードマシンにて不織布化し、クロスラッパにて積層化し基材層とする際、別体で作製した上記原着不織布意匠層を同時投入し、規定厚みに圧縮した後、180℃で熱処理することにより、面密度2.6kg/m²、厚み3.0mmの仮成形体を得た。上記によって得られた仮成形体を更に210℃の温度で加熱し、コールドプレスにより加圧成形して厚み0.5mmの成形体を得た。

【0042】比較例6

グレイに原着された2デニール×5.1mmのPET繊維50重量%と3デニール×5.1mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をニードルパンチすることにより面密度100g/m²の不織布意匠層を得た。更に、1デニール×5.1mmのPET繊維50重量%と1.5デニール×5.1mmのコンジュゲート繊維（芯成分：PET、鞘成分：融点170℃の共重合ポリエステル）50重量%から構成される繊維集合体をローラカードマシンにて不織布化し、クロスラッパにて積層化し基材層とする際、別体で作製した上記原着不織布意匠層を同時投入し、規定厚みに圧縮した後、180℃で熱処理することにより、面密度1.0kg/m²、厚み3.0mmの仮成形体を得た。上記によって得られた仮成形体を更に210℃の温度で加熱し、コールドプレスにより加圧成形して厚み2.0mmの成形体を得た。しかしながら、上記不織布は、所望の剛性を有せず、自動車用内装材として使用した場合、形状保持が困難であった。

【0043】従来例1

見かけ密度0.3g/cm³のフェノール樹脂含浸のフェルトを基材層とし、表皮意匠層としてニードルパンチ不織布、意匠層と基材層の接着剤として75μm厚のホットメルトフィルムを用いたものを積層構造化し、140℃、50kg/cm²にて加熱プレス成形し、厚さ5mmの自動車用内装材を得た。

【0044】従来例2

見かけ密度0.3g/cm³のフェノール樹脂含浸のフェルトを基材層とし、表皮意匠層としてトリコット表皮、該意匠層と基材層の接着剤として75μm厚のホットメルトフィルムを用いたものを積層構造化し、140℃、50kg/cm²にて加熱プレス成形し、厚さ5mmの自動車用内装材を得た。

【0045】従来例3

見かけ密度0.1g/cm³のポリフェニレンオキシド*

*発泡体を含む積層構造体を基材層Bとし、意匠層としてニードルパンチ不織布表皮、該意匠層と基材層の接着剤として50μm厚のホットメルトフィルムを用いたものを積層構造化し、160℃にて加熱、50kg/cm²にてプレス成形し、厚さ6mmの自動車用内装材を得た。

【0046】試験例

上記実施例1～8、比較例1～6、および従来例1～3で得られた自動車用内装材につき、前記の方法に従い、垂直入射吸音率測定を実施し、吸音性の判断を行った。更に、成形後の美観、触感に関しては、官能評価を行い、耐摩耗性に関しては、摩耗試験により測定し、それぞれ得た結果をサンプル内容と共に表1に示した。

【0047】

【表1】

| | 意 匠 層 | | | | | 配合比 (wt%) | 基 材 層 | | | | | 配合比 (wt%) | 厚み (mm) | 平均密度 (g/cm ³) | 美観 | 触感 | 吸音性 | 摩擦の しやすさ | 耐摩耗性 | 比較対象例 | | |
|------|----------------|--------------|--------------|--------------|------------|------------------------|--------------|--------------|--------------|--------------|------------|--------------|------------|------------------------------|----|-----|-----|-------------|------|-------|---|------|
| | 7H+7J繊維 | | バインダー繊維 | | | | 7H+7J繊維 | | バインダー繊維 | | | | | | | | | | | | | |
| | 含有量 (wt%) | 膜 厚 (7-8) | 含有量 (wt%) | 膜 厚 (7-8) | 融 点 (℃) | | 含有量 (wt%) | 膜 厚 (7-8) | 含有量 (wt%) | 膜 厚 (7-8) | 融 点 (℃) | | | | | | | | | | | |
| 実施例1 | 50 | 2 | 50 | 3 | 170 | 3 | 50 | 13 | 50 | 2 | 170 | 97 | 20 | 0.05 | ○ | ○ | ○ | ○ | ○ | 従来例1 | | |
| 実施例2 | 50 | 15 | 50 | 15 | 170 | 10 | 50 | 15 | 50 | 2 | 170 | 90 | 20 | 0.05 | ○ | ○ | ○ | ○ | ○ | 従来例1 | | |
| 実施例3 | 70 | 0.2 | 30 | 1.5 | 130 | 5 | 50 | 13 | 50 | 3 | 170 | 95 | 20 | 0.05 | ○ | ○ | ○ | ○ | ○ | 従来例1 | | |
| 実施例4 | 30 | 15 | 50 | 15 | 170 | 100 | - | - | - | - | - | 0 | 20 | 0.05 | ○ | ○ | ○ | ○ | ○ | 従来例1 | | |
| 実施例5 | 50 | 6 | 50 | 6 | 170 | 50 | 40 | 40 | 60 | 3 | 170 | 50 | 50 | 0.01 | ○ | ○ | ○ | ○ | ○ | 従来例1 | | |
| 実施例6 | 70 | 2 | 30 | 2 | 170 | 10 | 50 | 1.5 | 50 | 1.5 | 170 | 90 | 1 | 1 | ○ | ○ | ○ | ○ | ○ | 従来例1 | | |
| 実施例7 | 50 | 2 | 50 | 3 | 170 | 10 | 50 | 13 | 50 | 2 | 170 | 90 | 20 | 0.05 | ○ | ○ | ○ | ○ | ○ | 従来例1 | | |
| 実施例8 | 50 | 2 | 50 | 3 | 170 | 10 | 50 | 13 | 50 | 2 | 170 | 90 | 20 | 0.05 | ○ | ○ | ○ | ○ | ○ | 従来例1 | | |
| 比較例1 | 50 | 2 | 50 | 3 | 170 | 1 | 50 | 13 | 50 | 2 | 170 | 90 | 20 | 0.05 | × | ○ | ○ | ○ | ○ | 従来例1 | | |
| 比較例2 | 50 | 20 | 50 | 20 | 170 | 10 | 50 | 15 | 50 | 2 | 170 | 90 | 20 | 0.05 | △ | ○ | ○ | ○ | △ | 従来例1 | | |
| 比較例3 | 50 | 2 | 50 | 3 | 170 | 10 | 50 | 60 | 50 | 25 | 170 | 90 | 20 | 0.05 | ○ | ○ | ○ | ○ | ○ | 従来例1 | | |
| 比較例4 | 50 | 2 | 50 | 3 | 170 | 10 | 50 | 13 | 50 | 2 | 170 | 90 | 60 | 0.006 | △ | ○ | ○ | ○ | ○ | 従来例1 | | |
| 比較例5 | 50 | 2 | 50 | 3 | 170 | 10 | 50 | 13 | 50 | 2 | 170 | 90 | 0.5 | 1.3 | △ | △ | ○ | ○ | ○ | 従来例1 | | |
| 比較例6 | 50 | 2 | 50 | 3 | 170 | 10 | 50 | 1 | 50 | 1.5 | 170 | 90 | 20 | 0.05 | ○ | ○ | ○ | ○ | ○ | 従来例1 | | |
| 従来例1 | ニードルパンチ不織布表皮 | | | | | レジンフェルト | | | | | 5 | | | | | 0.3 | - | - | - | - | - | |
| 従来例2 | トリコット+スラブレタン表皮 | | | | | レジンフェルト | | | | | 5 | | | | | 0.3 | ○ | ○ | ○ | × | ○ | 従来例1 |
| 従来例3 | ニードルパンチ不織布表皮 | | | | | ポリフェニレンオキシド発泡体を含む積層構造体 | | | | | 6 | | | | | 0.1 | ○ | △ | ○ | ○ | ○ | 従来例1 |

◎：良好、○：同等、△：やや劣る、×：劣る

【図面の簡単な説明】

【図1】本発明による自動車用内装材の構成の一例を示す垂直断面図である。

【符号の説明】

- 1 基材層
40 2 意匠層

【図1】



フロントページの続き

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